Acta Arachnologica, 69 (1): 27–30, June 20, 2020

Further cases of conjoining anomaly in theraphosid spiders (Araneae: Theraphosidae)

Ray Gabriel & Danniella Sherwood*

Arachnology Research Association, United Kingdom.
E-mail: danni.sherwood@hotmail.com
**Corresponding author*

Abstract — Further cases of spermathecal conjoining are reported for the family Theraphosidae Thorell, 1869. Ocular conjoining in an undetermined species of *Sericopelma* Ausserer 1875 and a conjoining of metatarsus IV in a live adult male of *Ceratogyrus marshalli* Pocock 1897 are also reported.

Key words — anomaly, conjoining, eyes, metatarsus, spermathecae, tarantula

Introduction

Conjoining, both of anatomical structures and colour patterns, is relatively poorly documented in theraphosid spiders. Most current literature relates to species with distinctive opisthosomal patterning and/or specimens which were maintained in captivity (Gabriel 2006, 2010, 2011a, 2011c).

Lucas et al. (2009) were the first to properly recognise a conjoined spermathecae in a theraphosid, reporting a case they found in the Brazilian species *Acanthoscurria suina* Pocock 1903. *Acanthoscurria suina* possesses paired seminal receptacles (pers. obs.) but their aberrant, conjoined specimen showed four seminal receptacles. Gabriel (2011a) showed partially conjoined spermathecae in a captive specimen of *Acanthoscurria sternalis* Pocock 1903 and *Grammostola rosea* (Walckenaer 1837), each specimen showing an additional receptacle on one side of the respective spermathecae.

Gabriel (2011b) placed *Nhandu tripartitis* Schmidt 1997 into synonymy with *N. carapoensis* Lucas 1983 demonstrating the diagnosis of Schmidt (1997) was in error and that the spermathecae was partially conjoined. Schmidt (1997) had not recognised the spermathecae was conjoined, instead considering it to simply be a new form of spermathecae. This highlighted the peril of using aberrant specimens as name bearing types, an issue also discussed earlier by Gallon (1999) who reported a deformed male of *Ceratogyrus pillansi* (Purcell 1902).

In this work, we present further cases of spermathecal conjoining in theraphosid spiders and also present records of eye conjoining and leg segment conjoining.

Materials and Methods

Abbreviations, Institutes: NHMUK = Natural History Museum, London; MIUP = Museo de Invertebrados G.B. Fairchild, Universidad de Panama, Panama City; OUMNH = Oxford University Museum of Natural History, Oxford; SMF = Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main. Structures: ALE = anterior lateral eyes, AME = anterior medial eyes, PLE = posterior lateral eyes, PME = posterior medial eyes. Other: RGPC = Ray Gabriel Private Collection; colln. = collection.

Results

Davus ruficeps (Simon 1891)
(Fig. 1)

Material examined. 1 ♀ *Davus ruficeps* RGPC, captive bred, R. Gabriel colln.

Remarks. The spermathecae of a specimen of *Davus ruficeps* (Simon 1891) shows an almost complete second receptacle on the left hand side (Fig. 1). However, the aberrant receptacle is considerably more squat, elongate and is conjoined to the left hand side of the typical receptacle.

Hapalopus sp.
(Figs. 2–3)

Material examined. Exuvia from 1 ♀ *Hapalopus* sp. RGPC, imported with bananas from Colombia, R. Gabriel colln. [note: both exuvia and physical specimen are held in RGPC]

Remarks. Whilst examining the exuvia of an undetermined female of the genus *Hapalopus* Simon 1891 we noticed a similar conjoining anomaly to that described above for *D. ruficeps*, with an almost entirely duplicated spermathecal receptacle (Figs. 2–3). In this specimen, the definition of the aberrant re-

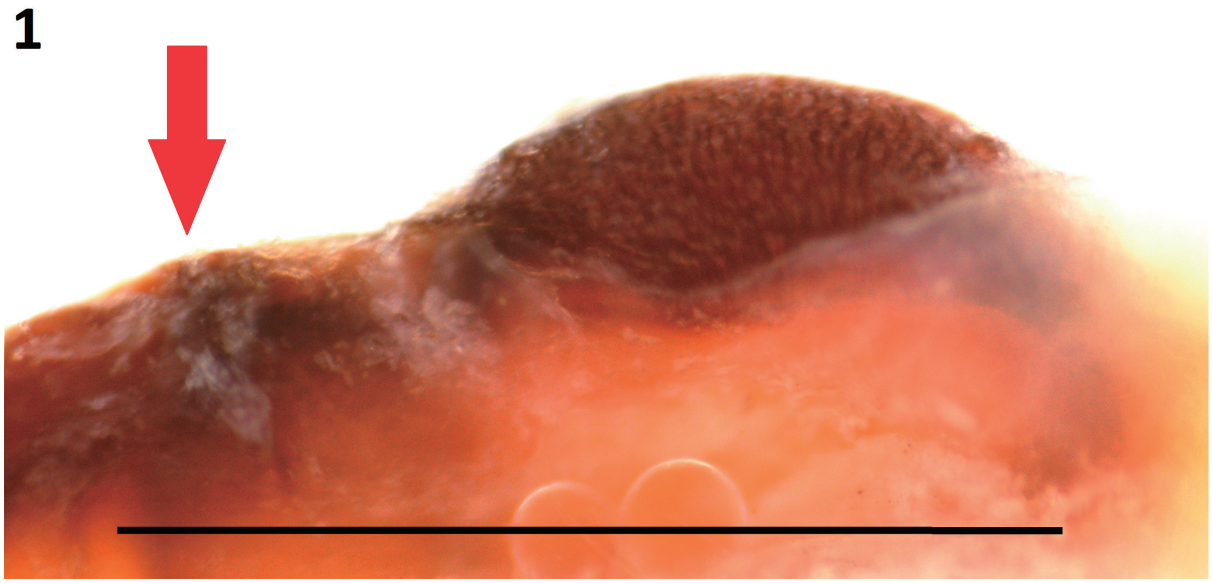
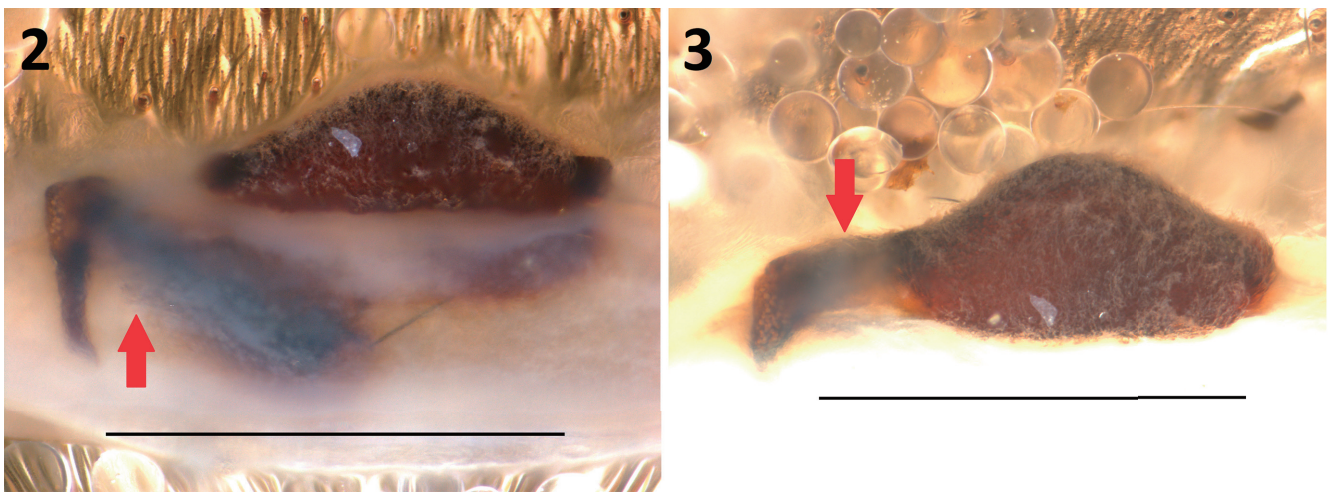


Fig. 1. *Davus ruficeps* (Simon 1891) female (RGPC), spermathecae dorsal view, showing duplication of receptacle. Scale line = 1mm. Red arrow indicates area of anomaly.



Figs. 2–3. *Hapalopus* sp. female (RGPC), spermathecae [from exuvia] showing duplication of receptacle, 2 dorsal view, 3 apical view. Scale line = 1mm. Red arrows indicates area of anomaly.

ceptacle was much more defined in shape and position.

Sericopelma sp.
(Figs. 4–6)

Material examined. 1 ♂ *Sericopelma* sp. MIUP, Panama (Gabriel & Sherwood in prep)

Remarks. Whilst examining *Sericopelma* specimens for an ongoing revision (Gabriel & Sherwood in prep) it was noticed that an adult male of an undescribed *Sericopelma* species from Panama showed ocular conjoining, the right hand side ALE being almost entirely duplicated (Figs. 4–6) which gave the appearance of the specimen having nine eyes. The left hand side ALE and all other eye pairs (AME, PME, PLE) were typical.

Ceratogyrus marshalli Pocock 1897
(Fig. 7)

Remarks. An adult male of *Ceratogyrus marshalli* Pocock 1897 maintained in captivity by hobbyist Phil Messenger

Figs. 4–6. Ocular conjoining in *Sericopelma* sp. male (MIUP), ocular tubercle showing conjoining of right hand side ALE, 4 anterior view, 5 lateral view, 6 dorsal view. Scale lines = 1mm. Red arrows indicates area of anomaly.

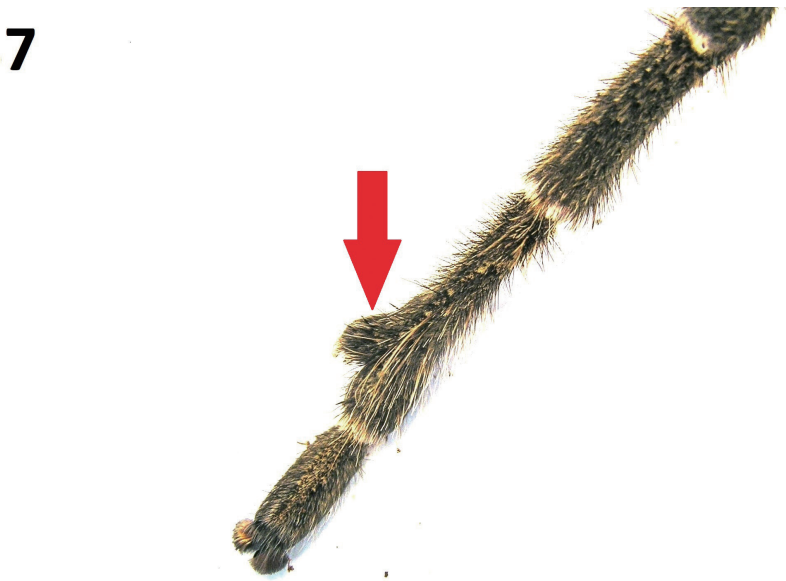


Fig. 7. Left hand side metatarsus IV of live adult male specimen *Ceratogyrus marshalli* Pocock 1897, showing partial conjoining. Red arrow indicates area of anomaly.

was brought to RG's attention with a conjoining of metatarsus IV. Unfortunately, this specimen was not able to be preserved for future reference and only a photograph was able to be taken. This specimen had an unusual anomaly to the medio-retrolateral aspect of the metatarsus (Fig. 7). We are not aware of this being recorded previously in theraphosid spiders in the published literature.

Discussion

Conjoining and other deformities of the female genitalia, in addition to the existence of gyandromorphs and intersexes, are well documented in araneomorph spiders (Kaston 1961, 1963; Roberts & Parker 1973). Conjoining of the spermathecae is reported in theraphosid spiders (Lucas et al. 2009; Gabriel 2011a, 2011b) and was previously illustrated [but not recognised as such] by Schmidt (1997). Recently, Laborda & Pérez–Miles (2017) reported bilateral gyandromorphy in the family Theraphosidae, describing a specimen of *Pterinochilus murinus* Pocock 1897. However, other forms of intersexuality are yet to be reported in the literature for theraphosid spiders.

In comparison, conjoining in the eyes of theraphosid spiders has been recorded sparingly in the literature (Ausserer 1871; Hamilton et al. 2016). More extreme ocular deformity was reported in *Aphonopelma steindachneri* Ausserer 1871 [as *Aphonopelma reversum* Chamberlin 1940] by Marer (1972) where in addition to conjoining on one eye, others were severely malformed or absent. Zinov (2013) reported the total absence of the ocular tubercle and eyes in a captive specimen of *Lasiodora parahybana* Mello–Leitão 1917. Conversely,

conjoining and other anomalies of the eyes are much more frequently recorded in araneomorph taxa (e.g. Kaston 1962; Kaston 1982; Ono & Kudo 1996; Jocqué & Michiels 2013).

Jocqué & Michiels (2013) reported a specimen of the araneomorph genus *Loxosceles* Heineken & Lowe 1832 with conjoining of tarsus I, metatarsus I and metatarsus II respectively on the right hand side of a female specimen from the Democratic Republic of the Congo. We are unaware of any published reports of the conjoining of leg segments in the Theraphosidae Thorell 1869 and thus it appears the example detailed in this work represents the first published record of leg conjoining in theraphosid spiders.

Conjoining of spermathecae in theraphosid spiders was previously mentioned predominately in captive specimens in the literature, which could have suggested these were possibly the result of captive husbandry or other factors in captivity. However, a number of cases detailed both above in the present study (e.g. *Sericopelma* sp.) and in previous works (e.g. Gabriel 2011b) feature wild specimens with such anomalies. Therefore, it is evident that conjoining is not an exclusive result of theraphosid spiders being maintained in captive environments.

This study aims to complement previous works on conjoining anomalies in theraphosid spiders through presentation of new cases, including the first case of leg conjoining reported for the family. Morphology remains an integral line of evidence for taxonomic definition and systematic placement and thus it is important that anomalies be properly recognised so as not to be confused as unique character states. It is highly likely further cases will be found by future workers and that, consequently, knowledge of conjoining anomalies and other deformities in theraphosid spiders will be expanded further.

Acknowledgements

We would like to thank Diomedes Quintero (MIUP) for access to the museum and loan of specimens. Peter Jäger (SMF) kindly supplied photographs of the holotype of *Nhandu tripartitis*. We thank James Hogan and Darren Mann (OUMNH) for allowing us use of the auto-montage system (sponsored by the A. McCrae bequest). The late Paul Hillyard (NHMUK) is thanked for assistance in obtaining the live *Hapalopus* specimen which was a stowaway in bananas. Phil Messenger (United Kingdom) is thanked for bringing the *C. marshalli* specimen to our attention.

References

Ausserer, A. 1871. Zweiter Beitrag zur Kenntniss der Arachniden–Familie der Territelariae Thorell (Mygalidae Autor). Verhandlungen der Kaiserlich–Königlichen Zoologisch–Botanischen Gesellschaft in Wien, 25: 125–206.

Chamberlin, R. V. 1940. New American tarantulas of the family Avicul ariidae. Bulletin of the University of Utah, 30: 1–39.

Gabriel, R. 2006. Variation in the abdominal pattern and colour of *Poecilotheria regalis*. J. Br. Trantula. Soc., 21: 116–120.

Gabriel, R. 2010. Siamesische oder zusam–mengewachsene Zwillinge bei *Poecilotheria regalis* Pocock, 1899. Arachne, 15: 33–40.

Gabriel, R. 2011a. Beispiele von zusammengewachsenen Spermatheken bei Vogelspinnen (Araneae, Mygalomorphae, Theraphosidae). Arachne, 16: 24–27.

Gabriel, R. 2011b. *Nhandu carapoensis* Lucas 1983 the senior synonym of *Nhandu tripartitis* Schmidt 1997, (Araneae: Theraphosidae), Newsl. Br. Arachnol. Soc., 121: 11–13.

Gabriel, R. 2011c. Weitere Fälle von zusammengewachsenen Vogelspinnen (Araneae: Theraphosidae). Arachne, 16: 4–7.

Gallon, R. C. 1999. Appendage deformity in an African theraphosid spider: *Coelogenium pillansi* Purcell, 1902. Newsl. Br. Arachnol. Soc., 85: 8.

Hamilton, C. A., Hendrixson, B. E. & Bond, J. E. 2016. Taxonomic revision of the tarantula genus *Aphonopelma* Pocock, 1901 (Araneae, Mygalomorphae, Theraphosidae) within the United States. ZooKeys, 560: 1–340.

Jocqué, R. & Michiels, J–P. 2013. Two Remarkable Spider Teratologies (Araneae). Newsl. Br. Arachnol. Soc., 127: 12–13.

Kaston, B. J. 1961. Gynandromorphs and Intersexes. J. NY Entomol. Soc., 69: 177–190.

Kaston, B. J. 1962. Ocular anomalies in spiders. Bull. Brooklyn Entomol. Soc., 57: 17–21.

Kaston, B. J. 1963. Abnormal Duplication of the Epigynum and Other Structural Anomalies in Spiders. Trans. Am. Microsc. Soc., 82: 220–223.

Kaston, B. J. 1982. Additional ocular anomalies in spiders. J. Arachnol., 10: 279–281.

Laborda, A. & Pérez–Miles, F. 2017. The first case of gynandry in Mygalomorphae: *Pterinochilus murinus*, morphology and comments on sexual behavior (Araneae: Theraphosidae). J. Arachnol., 45: 235–237.

Lowe, R. T. 1832. Descriptions of two species of Araneidae, natives of Madeira. Zool. J., 5: 320–323.

Lucas, S. 1983. Descrição de gênero e espécie novos da subfamília Theraphosinae (Araneae, Ortoghatha, Theraphosidae. Memorias do Instituto de Butantan, 44/45: 157–160.

Lucas, S, Brescovit, A. D. & Paula, F. S. 2009. Eine merwurdige Erscheinung: Verdoppelung der Spermathek bei *Acanthoscurria suina* Pocock, 1903 (Araneae, Mygalomorphae, Theraphosidae). Arachne, 14: 12–14.

Marer, P. J. 1972. An Eye Deformity in a Tarantula Spider, *Aphonopelma reversum* (Araneae; Theraphosidae). Pan-Pacific Entomol.,48 221–225.

Mello–Leitão, C. F. de 1917. Notas arachnologicas. 5, Especies novas ou pouco conhecidas do Brasil. Brotéria (Ser. Zool.), 15: 74–102.

Ono, H., Kudo, Y. 1996. Anomaly in a Ground Spider (Araneae: Gnaphosidae) from Japan. Acta Arachnol., 45: 73–75.

Pocock, R. I. 1897. On the spiders of the suborder Mygalomorphae from the Ethiopian Region, contained in the collection of the British Museum. Proc. Zool. Soc. Lond., 65: 724–774.

Pocock, R. I. 1903. On some genera and species of South–American Avicul ariidae. Ann. Mag. Nat. Hist., 11: 81–115.

Purcell, W. F. 1902. On the South African Theraphosidae or "Baviaan" spiders, in the collection of the South African Museum. Trans. SA Phil. Soc., 11: 319–347.

Roberts, M. J. & Parker, J. R. 1973. Gynandry and intersexuality in spiders. Bull. Br. Arachnol. Soc., 2: 177–183.

Schmidt, G. 1997. *Nhandu tripartitus* sp. n. (Araneae: Theraphosidae: Theraphosinae), eine zweite Nhandu–Art. Arachnologisches Magazin, 5: 1–5.

Thorell, T. 1869. On European spiders. Nova Acta Regiae Societatis Scientiarum Upsaliensis, 7: 1–108.

Walckenaer, C. A. 1837. Histoire naturelle des insectes. Aptères. Paris 1, 1–682.

Zinov, T. 2013. Anomalies of visual organs amongst tarantulas: Absence of eyes in Lasiodora parahybana. J. Br. Tarantula Soc., 28: 117–120.

Received November 16, 2019 / Accepted February 28, 2020